

CLAIMS

1. An amplification apparatus that has a nonlinear high-frequency power amplifier that amplifies a first
5 input signal; and a power supply voltage control section that forms a control signal for controlling a power supply voltage of said high-frequency amplifier based on a second input signal; and that amplifies a signal level of said first input signal by means of said high-frequency power
10 amplifier to a level in accordance with said second input signal,

wherein said power supply voltage control section comprises:

an adder that adds together said second input
15 signal and a negative feedback signal;

an integrator that integrates output of said adder;

a quantizer that quantizes output of said
integrator in accordance with a predetermined
threshold value; a low pass filter that eliminates
20 quantization noise from output of said quantizer;
and

a compensator that has an inverse
characteristic of said low pass filter or a
characteristic approximating thereto and performs
25 compensation of a feedback amount of said negative
feedback signal.

2. The amplification apparatus according to claim 1,
wherein said compensator is provided within a negative
feedback loop from said low pass filter toward said adder,
and performs compensation and feedback of part of output
5 of said low pass filter.

3. The amplification apparatus according to claim 1,
wherein said compensator is provided within a main loop
from said adder toward said low pass filter, and performs
10 compensation of part of output of said adder.

4. The amplification apparatus according to claim 1,
wherein:

said powersupply voltage control section further
15 comprises a detector that extracts said second input
signal component from output of said high-frequency power
amplification section; and
said compensator performs compensation and feedback of
part of output of said detector.

20

5. The amplification apparatus according to claim 1,
wherein said quantizer is configured as a polyphase
quantizer having a plurality of quantizers.

25 6. The amplification apparatus according to claim 1,
wherein: said power supply voltage control section
further comprises an input selection section that

selectively inputs either said second input signal or a fixed voltage; and

operation of said power supply voltage control section is switched between operation as a class D
5 amplifier and operation as a DC-DC converter in accordance with input switching of said input selection section.

7. The amplification apparatus according to claim 6, wherein said high-frequency power amplification section
10 has a switching operation mode and a linear operation mode, and executes linear operation mode when said power supply voltage control section operates as a DC-DC converter.

15 8. The amplification apparatus according to claim 1, wherein:

said power supply voltage control section further comprises an AD converter that converts analog output of said low pass filter to a digital signal;

20 said compensator performs compensation and feedback of part of output of said AD converter; and

said adder, said integrator, said quantizer, and said compensator are configured as digital circuits.

25 9. The amplification apparatus according to claim 1, wherein:

said power supply voltage control section comprises

a variable attenuator that has an attenuation factor varying function in a negative feedback loop from said low pass filter toward said adder; and

5 said quantizer is configured as a variable-output quantizer that has an output level varying function, and operates so that a product of an output level of said variable-output quantizer and an attenuation factor of said variable attenuator is constant.

10 10. The amplification apparatus according to claim 9, wherein said variable-output quantizer comprises an output transistor switch and a power supply regulator, and varies a power supply voltage of said output transistor switch by means of said power supply regulator.

15

11. The amplification apparatus according to claim 1, wherein: said amplification apparatus is provided in a polar modulation transmitter; said first information signal is a phase modulation high-frequency signal in
20 which a carrier frequency is modulated by a phase modulation signal of a baseband modulation signal; and said second input signal is an amplitude modulation signal of said baseband modulation signal.

25